DET NORSKE VERITAS

EC TYPE-EXAMINATION CERTIFICATE

Certificate No. 79331-2010-CE-NOR-DNV rev. 2
This Certificate consists of 5 pages

This is to certify that the products

Pressure Vessels

with name and/or type designations

Piston Accumulator, Shock Absorber, Accumulator, Nitrogen-Bottle, Gas-Reservoar, Pressure Tank, Gas-Bottle

Manufactured by

PMC Servi Cylinderservice AS

RISSA, Norway

has been assessed with respect to

the conformity assessment procedure described in Annex III (Module B) of Council Directive 97/23/EC on Pressure Equipment, as amended, and found to comply.

Further details are given overleaf

Place and date:
Høvik, 8 March 2011

This Certificate is valid until:
8 December 2020

for Det Norske Veritas AS

Hans Dyrdal Rasmussen
Service Responsible, PED
NACNO378

CE

Notified Body No.:
0575

John Poulsson
Technical Reviewer

Jurisdiction

Application of Council Directive 97/23/EC of 29 May 1997 on Pressure Equipment, adopted as regulation of 1999-06-09 no. 721 ”Forskrift for Trykkpåkjent Utstyr” by the Norwegian Directorate of Civil Protection and Emergency Planning and by the Petroleum Safety Authority Norway.

Certificate history

Certificate/Revision	Description	Issue Date
PED-B-61 rev. 1, appendix rev. 2.	Original Certificate	16 August 2006
79331-2010-CE-NOR-DNV	Renewed Certificate	8 December 2010
79331-2010-CE-NOR-DNV, rev. 1	Revised Certificate, added new materials (PMA)	21 February 2011
79331-2010-CE-NOR-DNV, rev. 2	Revised Certificate, added new materials (PMA)	8 March 2011

Products covered by this Certificate

Product Name	Category	Module	Applied Product Standards
Pressure vessels for Hydraulic Systems	IV	B	EN-14359:2006 / EN-13445:2009

Design Data

Maximum Allowable Pressure (PS)	Maximum inside diameter	Minimum/ Maximum Allowable Temperature (TS)
1500 bar g	Ø700	-20 ˚C / 80 ˚C

Applications/Limitations

- The Pressure vessels are to be hydraulic tested with a minimum pressure of 1.43 times the design pressure. (ref.: PED, annex I, section 7.4)
- The following materials have been subject to a Particular Material Appraisal as required by PED Annex 1 Section 4.2c. The material grades are found acceptable under the conditions as stated in the following documents issued for the Particular Material Appraisal:

Material Standard	Grade	PMA Rev.:
ISO 3506	A4-80	1
ASTM A320	L7	0
EN-10025-2	S355J2+N	1
EN-10219-1	S355J2H	0
EN-10210-1	S355J2H	1
ASME SA-351	CF3M	0
ASME SA-351	CF8M	0
ASME SA-995	UNS J92205	2
ASME SA-995	UNS J93371	0

ASME SA-995	UNS J93404	2
ASTM A-890	UNS J92205	2
ASTM A-890	UNS J93371	0
ASTM A-890	UNS J93404	2
EN-10088-3	1.4418	0
EN-10305-1	E355+N	0
ASME SA-790	UNS S31803	1
ASME SA-789	UNS S31803	1
ASME SA-182	UNS S31803	1
ASME SA-182	UNS S32750	1
Sandvik Specification for SAF2205	SAF 2205	1
Sandvik Specification for SAF2507	SAF 2507	1

- For Engineering and structural steels, see additional design restrictions in the applicable PMA-documents.
- For Design Temperatures below 0 ˚C, additional design restrictions may apply in applicable PMA-documents for relevant materials.

Type Examination documentation

The type examination is based on reference drawings and calculations done for a representative range of the products. The manufacturer is allowed to supply variants of the approved types of pressure vessels within the limitations specified above.

The manufacturer shall make specific drawings and calculations for each variant.

Inspection of manufacturing and testing of prototypes were not required during this re-certification. Ref. DNV Trondheim's Assessment Report dated 2010-12-01.

List of reviewed drawings and documents:

Drawing/Document No	**Rev.**	**Date**	**Title**	**Status** *)
643-94	B	31.05.2010	Piston Akkumulator 6L	A
646-04	-	12.03.2001	Stempelakkumulator, rør	A
646-05	-	13.03.2001	Stempelakkumulator, stempel	FI
646-06	A	15.12.2009	Stempelakkumulator, endelokk-oljeside	A
644-155	A	15.12.2009	Piston Accumulator, gland	A
646-07	A	15.12.2009	Stempelakkumulator, endelokk gass-side	A
Doc no.: 423	-	16.12.2009	Calculations, 6L, Piston Accumulator	A
634-22	C	31.05.2010	Shock Absorber DS SG 310/220X1900 H-R-O-B-N-N assembly drawing	A
623-56	-	98.03.02	Stempel PA 350	FI
622-54	B	12.01.2010	Endelokk PA 350X160	A

622-55	A	12.01.2010	Sylrør PA 350X2397	A
622-53	B	12.01.2010	Endelokk PA 350X78	A
Doc no.: 811	-	12.01.2010	Calculations 210 L Shock Absorber	A
Doc no.: 1050-RA-006	A	11.03.2010	FEM stress analysis, Shock Absorber	A
03944	B	31.05.2010	Accumulator 5L	A
03944-02	A	7.01.2010	Accumulator, welded endcap	A
03944-03	A	07.01.2010	Accumulator, Threaded Endcap	A
03944-01	A	07.01.2010	Accumulator, Barrel	A
Doc no.: 627	-	06.01.2010	Calculations 5L Accumulator	A
Do no.: 1050-RA-001	B	09.02.2010	FEM stress analysis, Accumulator	A
03945	B	31.05.2010	Nitrogen Bottle, 10 litre	A
03945-01	-	12.12.2005	Nitrogen Bottle, Barrel	A
03945-02	-	12.12.2005	Nitrogen Bottle, Welded Endcap	A
03945-03	-	12.12.2005	Nitrogen Bottle, Threaded Endcap	A
Doc no.: 628	-	06.01.2010	Calculations 10L Nitrogen Bottle	A
Doc no.: 1050-RA-002	A	03.03.2010	FEM stress analysis Nitrogen Bottle	A
03946	B	31.05.2010	Gas Reservoar 10 litre	A
03946-01	A	07.01.2010	Gas Reservoar, Barrel	A
03946-02	A	07.01.2010	Gas Reservoar, welded endcap 1	A
03946-03	A	07.01.2010	Gas Reservoar, welded endcap 2	A
Doc no.: 629	-	06.01.2010	Calculations, 10 L Gas Reservoar	A
Doc no.: 1050-RA-003	A	03.03.2010	Fem stress analysis Gas Reservoir	A
03947	B	31.05.2010	Pressure Tank, 15 litre	A
03947-01	-	12.12.2005	Pressure tank, Barrel	A
03947-02	-	12.12.2005	Pressure Tank, Welded endcap	A
03947-03	-	12.12.2005	Pressure Tank, Threaded endcap	A
Doc no.: 630	-	06.01.2010	Calculations 15L Pressure Tank	A
Doc no.: 1050-RA-004	A	08.03.2010	FEM stress analysis Pressure tank	A
03948	B	31.05.2010	Gas Bottle 20 Litre	A
03948-01	A	11.01.2010	Gas Bottle, Barrel	A
03948-02	A	11.01.2010	Gas Bottle, Endcap	A

03948-03	A	11.01.2010	Gas Bottle, Endcap	A
Doc no.: 631	-	08.01.2010	Calculations 20 L Gas Bottle	A

*) A = Approved, AC = Approved with comments, FI = For information

Marking of Product:

The pressure vessels are to be marked according to the Pressure Equipment Directive, 97/23/EC, Annex I, section 3.3.

Terms and conditions

The certificate is subject to the following terms and conditions:

- In case of damages caused by defective products, directive 85/374/EEC, as amended, will apply
- The Certificate is only valid for the product(s) listed above
- The Certificate is concerned with the design and prototype testing of the product, only

The following may render this Certificate invalid:

- Changes in the design or construction of the product(s)
- Changes or amendments to the referenced directive(s)
- Changes or amendments in the standard(s) which form the basis for documenting compliance with the essential requirements of the directive(s)

Conformity declaration and marking of product

This Certificate does not give the Manufacturer the right to CE mark and put on the market the product(s) listed on this Certificate. Only after the product(s) have been found to comply with the requirements in a following Conformity Assessment Module C1, D, E or F, the Manufacturer may draw up an EC declaration of conformity and legally affix the CE mark followed by the Notified Body identification number of DNV (**0575**)

END OF CERTIFICATE